Greyson Brothers

Education

2022 - 2025 **Johns Hopkins University**
M.S. Computer Science, GPA 4.0

2016 - 2020 **University of California, Los Angeles (UCLA)**
B.S. Applied Mathematics, GPA 3.5

Interests

Reinforcement Learning (RL)	Continual Learning	Sample Efficiency	Self-Supervised Learning
Attention Mechanisms	Memory Mechanisms	Sparse Coding	The Hippocampus

Publications

Conference Papers

OpenReview [1] **G. Brothers**. "Robust Noise Attenuation via Adaptive Pooling of Transformer Outputs". *International Conference on Machine Learning* (**ICML 2025**). **[*Spotlight*, Top 2.6% of 12k submissions]**

OpenReview [2] J. McClellan, **G. Brothers**, F. Huang, P. Tokekar. "PEnGUiN: Partially Equivariant Graph NeUral Networks for Sample Efficient MARL". *Reinforcement Learning Conference* (**RLC 2025**).

[3] J. Winder, W. Mannering, **G. Brothers**, A. Nayak, J. Harsono, N. Ford, N. Haghani, T. Urban. "Beyond Human Reasoning: Bridging the Human-machine Information Gap". *SPIE Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications* (**SPIE 2025**).

Workshop Papers

OpenReview [4] **G. Brothers**. "Robust Noise Attenuation via Adaptive Pooling of Transformer Outputs". *Tokenization Workshop* (**ICML 2025 Workshop**) [Non-archival dual submission with main track [1]]

OpenReview [5] **G. Brothers**, W. Mannering, A. Tien, J. Winder. "Uncovering Uncertainty in Transformer Inference". *Workshop on Foundation Model Interventions* (**NeurIPS 2024 Workshop**).

Experience

2021 – Present (4.5 years) **Johns Hopkins University Applied Physics Laboratory (JHU/APL)**
AI/ML Research Scientist, Advanced AI Algorithms Section
Advisors: Dr. John Winder, Dr. Willa Mannering

Selected Public Research

- **Transformer-based policies for multi-agent RL:** proposed/implemented entity-centric transformer control; enabled dynamic observation space and improved sample efficiency; adopted by 9 internal projects; informed ICML'25 theoretical paper and SPIE'25 application paper (see [1], [3]).
- **Partial-equivariance for sample-efficient MARL:** co-designed a GNN that blends equivariant and non-equivariant layers to handle approximate symmetries; validated on controlled categories of partial symmetry in multi-agent environments, published in RLC'25 (see [2]).
- **Uncertainty in transformer inference:** analyzed token convergence in the residual stream to estimate uncertainty at generation time; results presented at NeurIPS'24 MINT workshop (see [5]).

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Engineering & Leadership

- Built/maintained a PyTorch policy library used by 12 projects and a modular RL environment used by 17 projects; accelerated multi-agent experimentation and benchmarking.
- Led proposal design and execution for internal research; 5/9 proposals awarded; served as technical lead for research projects totaling $2.7M in internal funding.

Additional work: *(detail omitted due to sponsor sensitivity, available on request with release approval)* Contributed to 2-5 concurrent autonomy projects per year, spanning multi-agent collaboration, safe RL, spacecraft constellations, continual learning, concept learning, and human-machine teaming.

2024 – 2025 (6 Months)

Independent Study, Johns Hopkins University

Graduate Student Researcher (Part-time)

Advisor: Dr. Mark Fleischer

- **Optimal pooling in transformer embedding models:** found standard pooling methods (Avg, Max, ClsToken) have failure modes as the proportion of irrelevant tokens varies; showed attention based pooling yields provably near-optimal token compression, published at ICML'25 (see [1]).

2019 – 2020 (6 Months)

Arisaka Lab, UCLA

Research Assistant

Advisor: Dr. Katsushi Arisaka

- **Human visual perception of space over time:** constructed a testbed consisting of LED strips along radial axes of a hemispherical dome to measure temporal responses to peripheral visual stimuli; found reaction time in human subjects was precisely proportional to stimulus eccentricity.

Invited Talks

2025 "**Robust Multi-Agent Autonomy with Transformers**". *Intelligent Systems Symposium, Johns Hopkins University Applied Physics Laboratory.*

2025 "**Bridging the Human-machine Information Gap**". *Workshop on AI for Safety Critical Systems, Conference on Information Sciences and Systems* (CISS 2025).

Awards

2025 **Propulsion Grant Prize for Innovation**. Project: "Eliminate the Middleman". Selected as one of the top 3 internal research projects at the lab, awarded $1.1M funding over 3 years. (**JHU/APL**)

2024 **Light the Fuse Award**. Project: "Human-Machine Teaming Testbed". Recognized significant cross-lab collaboration and innovation. (**JHU/APL**) [***Award***]

2022 **Propulsion Grant Prize for Innovation**. Project: "Beyond Human Reasoning". Selected as one of the top 3 internal research projects at the lab, awarded $1.3M funding over 4 years. (**JHU/APL**) [***Award***]

Grants & Leadership

FY 2026 **Co-PI:** "Foundation Models in a Hurry". *Internal Research and Development (IRAD) Grant.* (**JHU/APL**)

FY 2025 – 2026 **PI:** "Advanced Autonomy Development Suite". *IRAD Grant.* (**JHU/APL**)

FY 2024 **Co-PI:** "Professor XAI: Reading the Minds of LLMs". *IRAD Grant.* (**JHU/APL**)

FY 2024 **Co-PI:** "Exploring Iterative Reasoning in LLMs and the Transferability to Multimodal Models". *Compute grant*, *National AI Research Resource (***NSF-NAIRR***) Pilot Program,* NAIRR240129. [***Award***]

FY 2024 – 2026 **Technical Lead:** "Eliminate the Middleman". *IRAD Grant.* (**JHU/APL**)

FY 2021 – 2024 **Technical Lead:** "Beyond Human Reasoning". *IRAD Grant.* (**JHU/APL**)

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